

**IN THE CLAIMS:**

1 1. (Currently Amended) A system for indexing and manipulating backup data stored on a  
2 destination storage system, comprising:

3 | one or more source ~~servers~~ storage systems configured to transmit the backup data  
4 to the destination storage system;

5 | a management application executed by a processor, wherein the management ap-  
6 | plication is configured to ~~(a)~~ communicate with the destination storage system and further  
7 | configured to access data identifiers related to the backup data organized in a directory  
8 | tree structure representing a plurality of persistent consistency point images (PCPIs) of  
9 | the backup data, wherein each PCPI is associated with a creation time, ~~(b)~~ scan a root of  
10 | each PCPI comprising the directory tree to generate an index of directories, files, or  
11 | qtrees associated with the directory tree, and ~~(c)~~ organize the data identifiers into a struc-  
12 | ture that enables the backup data to be displayed; and

13 | a user interface to select a directory, file, or qtree to view, wherein the manage-  
14 | ment application is further configured to return a list of the selected directory, file, or  
15 | qtree and one or more versions of the selected directory, file, or qtree.

1 2. (Original) The system as set forth in claim 1 further comprising a database that stores  
2 the data identifiers and rules for handling the data identifiers for retrieval by the user in-  
3 terface and the management application.

1 3. (Previously Presented) The system as set forth in claim 2 further comprising, in the  
2 destination storage system, a network data management protocol (NDMP) extension  
3 communicating with a storage operating system of the destination storage system and  
4 providing NDMP-based communication between the management application and the  
5 storage operating system.

1 4. (Original) The system as set forth in claim 3 further comprising a job framework that  
2 organizes a plurality of backup operations and restore operations by the management ap-

3 plication and that communicates with the user interface so as to enable a user to access  
4 information with respect to status of the backup operations and restore operations organ-  
5 ized by the job framework.

1 5. (Currently Amended) The system as set forth in claim 4 further comprising a scheduler  
2 that interfaces with the source storage system and that performs the backup operations,  
3 transmitting the backup data from the source storage system to the destination storage  
4 system at a predetermined time interval.

1 6. (Currently Amended) The system as set forth in claim 1 wherein the user interface  
2 comprises a screen that enables a user to set a desired lag time after which failure to  
3 complete a scheduled backup operation ~~caused~~ causes an event to occur.

1 7. (Currently Amended) The system as set forth in claim 1 further comprising the user  
2 interface to select ~~(a)~~ a listing of source data entries indexed by names of the source stor-  
3 age system and ~~(b)~~ a listing of source data entries indexed by names of volumes of the  
4 destination storage system in which the backup data from the source data resides.

1 8. (Previously Presented) The system as set forth in claim 7 wherein each of the entries of  
2 each listing comprises a browse backups button that enables a user to view backup data  
3 stored on the destination storage system that is associated respectively with each of the  
4 entries.

1 9. – 11. (Cancelled)

1 12. (Previously Presented) The system as set forth in claim 8 wherein each of the entries  
2 of each listing comprises a restore button that enables a user to view restorable backup  
3 data structures with respect to each of the entries and to restore the backup data structures  
4 to the source data.

1 13. (Cancelled)

1 14. (Currently Amended) The system as set forth in claim 12 wherein each qtree com-  
2 prises one or more qtree relationships with respect to other qtrees within the source stor-  
3 age system.

1 15. (Previously Presented) The system as set forth in claim 1 wherein the user interface  
2 comprises a command for destroying a qtree relationship between the source data and a  
3 selected volume of the backup data in the destination storage system.

1 16. (Previously Presented) The system as set forth in claim 15 wherein the management  
2 application is configured to delete a respective qtree associated with the qtree relationship  
3 on the destination storage system in response to activation of the command for destroying  
4 the qtree relationship.

1 17. (Previously Presented) The system as set forth in claim 1 further comprising, in the  
2 user interface, a screen that enables selected data of the source data to be listed as entries  
3 and to be transmitted as the backup data to the destination storage system at a time sepa-  
4 rate from a scheduled backup time.

1 18. (Currently Amended) A method for indexing and manipulating backup data stored on  
2 a destination storage system from source data stored a source storage system, comprising:  
3 communicating, by a management client, with the destination storage system and  
4 accessing data identifiers related to the backup data organized in a tree structure and rep-  
5 resenting a plurality of persistent consistency point images (PCPIs) of the data, each with  
6 associated information related to creation time;  
7 scanning the plurality of PCPIs to generate an index of directories, files, or qtrees  
8 created at different points in time;

organizing the data identifiers into a structure that enables the data to be displayed according to the directory, the file, or the qtree; and

selecting, on a user interface, a directory, file, or qtree to view, wherein the management application-client returns a list of the selected directory, file, or qtree created at different points in time.

19. (Original) The method as set forth in claim 18 further comprising storing, in a database, the data identifiers and rules for handling the data identifiers for retrieval by the user interface and the management application.

20. (Currently Amended) The method as set forth in claim 19 further comprising providing, in the destination storage system, a network data management protocol (NDMP) extension communicating with a storage operating system of the destination storage system and providing NDMP-based communication between the management application and the storage operating system.

21. (Original) The method as set forth in claim 20 further comprising organizing, in a job framework, a plurality of backup operations and restore operations by the management application and that communicates with the user interface so as to enable a user to access information with respect to status of the backup operations and restore operations organized by the job framework.

22. (Currently Amended) The method as set forth in claim 21 further comprising interfacing a scheduler with the source storage system and performing, at scheduled times, backup operations that transmit the backup data from ~~a~~ the source storage system to the destination storage system at a predetermined time interval.

1 23. (Previously Presented) The method as set forth in claim 22 further comprising ena-  
2 bling a user to set a desired lag time after which failure to complete a scheduled backup  
3 operation causes an event to occur.

1 24. (Currently Amended) The method as set forth in claim 18 further comprising select-  
2 ing (a) a listing of source data entries indexed by names of the source storage system and  
3 (b) a listing of source data entries indexed by names of volumes of the destination storage  
4 system in which the backup data from the source data resides.

1 25. (Currently Amended) The method as set forth in claim 24 further comprising enabling  
2 a user to view backup data stored on the destination storage system that is associated re-  
3 spectively with each of the entries.

1 26. – 28. (Cancelled)

1 29. (Previously Presented) The method as set forth in claim 24 further comprising ena-  
2 bling a user to view restorable backup data structures with respect to each of the entries  
3 and to restore the backup data structures to the source data.

1 30. (Cancelled)

1 31. (Currently Amended) The method as set forth in claim 18 wherein each qtree com-  
2 prises qtree relationships with respect to other qtrees within the source storage system.

1 32. (Currently Amended) The method as set forth in claim 18 further comprising provid-  
2 ing, in the user interface, a command for destroying a qtree relationship between source  
3 data and a selected volume of the backup data in the destination storage system.

1 33. (Currently Amended) The method as set forth in claim 32 further comprising, in re-  
2 sponse to activation of the command for destroying the qtree relationship, deleting a re-  
3 spective qtree associated with the qtree relationship on the destination storage system.

1 34. (Currently Amended) The method as set forth in claim 18 further comprising provid-  
2 ing, in the user interface, a screen that enables selected data of the source data to be listed  
3 as entries and to be transmitted as the backup data to the destination storage system at a  
4 time separate from a scheduled backup time.

1 35. (Previously Presented) A method for managing backup of data, comprising:  
2 scanning a plurality of persistent consistency point images (PCPIs) stored on a  
3 destination storage system;  
4 generating an index of qtrees in response to scanning the plurality of PCPIs,  
5 wherein each qtree has one or more versions created at different points in time;  
6 selecting a particular qtree to view; and  
7 displaying each version of the particular qtree created at the different points in  
8 time.

1 36. (Cancelled)

1 37. (Previously Presented) The method as set forth in claim 35 further comprising format-  
2 ting information into a network data management protocol (NDMP).

1 38. (Currently Amended) The method as set forth in claim 35 further comprising activat-  
2 ing user interface buttons associated with entries of the displayed qtree to conduct.

1 39. (Currently Amended) A computer-readable medium containing executable program  
2 instructions executed by a processor, comprising:

program instructions that scan a plurality of persistent consistency point images (PCPIs) stored on a destination storage system;

~~program instructions that generate~~generating an index of qtrees in response to scanning the plurality of PCPIs, wherein each qtree has one or more versions created at different points in time;

program instructions that select a particular qtree to view; and

program instructions that display each version of the particular qtree created at the different points in time.

40. (Cancelled)

41. (Previously Presented) The computer-readable medium as set forth in claim 39 further comprising program instruction that format information into a network data management protocol (NDMP).

42. (Previously Presented) A system, comprising:

a source storage system configured to generate a plurality of persistent consistency point images (PCPIs) associated with a particular directory tree, and further configured to transfer the plurality of PCPIs to a destination storage system;

the destination storage system configured to execute a management client, wherein the management client is configured to organize the plurality of PCPIs into an index using a database to allow the plurality of PCPIs to be displayed in (a) a listing of source data entries indexed by the particular directory tree, wherein each PCPI of the particular directory tree is created at one or more different times (b) a listing of source data entries indexed by names of the source storage system, and (c) a listing of source data entries indexed by names of volumes of the destination storage system in which backup data from the source storage system resides; and

13           an interface configured to select a data entry for the particular directory tree, and  
14   the management client further configured to return a list of the plurality of PCPIs associ-  
15   ated with the particular directory tree.

1   43. – 45. (Cancelled)

1   46. (Previously Presented) The system of claim 42, wherein the database stores the plu-  
2   rality of PCPIs and rules for handling the plurality of PCPIs for retrieval by the interface  
3   and the management client.

1   47. (Previously Presented) The system of claim 42, wherein the source storage system,  
2   upon initialization, sends a base PCPI and select data to the destination storage system.

1   48. (Previously Presented) The system of claim 42, further comprising a scheduler that  
2   interfaces with the source storage system and performs backup operations of transmitting  
3   the backup data comprising one or more PCPIs and change data from the source storage  
4   system to the destination storage system at a predetermined time interval.

1   49. (Previously Presented) A method, comprising:  
2       transferring a plurality of persistent consistency point images (PCPIs) from a plu-  
3   rality of source servers to at least one destination storage system;  
4       scanning the plurality of PCPIs to create an index of data structures on the at least  
5   one destination storage system, wherein each data structure comprises a plurality of qtree  
6   versions each created at different points in time;  
7       selecting a particular data structure to view;  
8       returning all qtree versions created at the different points in time for the particular  
9   data structure; and  
10      selecting a particular qtree from all the returned qtree versions created at different  
11   points in time to restore.



1 50. (Previously Presented) A system, comprising:  
2 at least one source server configured to transfer a plurality of persistent consis-  
3 tency point images (PCPIs) to at least one destination storage system;  
4 a management application executed by a processor configured to scan the plural-  
5 ity of PCPIs to create an index of data structures on the at least one destination storage  
6 system, wherein each data structure comprises a plurality of qtree versions each created at  
7 different points in time;  
8 the management application further configured to select a particular data structure  
9 to view and further configured to return all qtree versions created at the different points in  
10 time for the particular data structure; and  
11 a user interface configured to display all the returned qtree versions created at dif-  
12 ferent points in time, and further configured to allow a user to select a particular qtree  
13 from all the returned qtree versions to restore.